TECHNOLOGICAL PEDAGOGICAL CONTENT KNOWLEDGE OF RELIGIOUS AND MORAL EDUCATORS: WHAT MATTERS MOST?

Martin Owusu[1] & Ebenezer Boakye[2]
[1]Department of Arts Education, University of Cape Coast,
[1]Department of Cultural Studies, S.D.A Senior High School, Agona-Ashanti

Received: January 01, 2022 Accepted: February 01, 2022

ABSTRACT: *Teachers' ability to blend their professional practices with technology has become crucial in our current dispensation. As such, most researchers have empirically tested teachers' knowledge on the seven facets of the Technological Pedagogical Content Knowledge (TPACK) construct as propounded by Mishra andKoehler and found that most teachers are knowledgeable in their content and pedagogical knowledge.The focus of this study,however,was to unpackthe Technological Knowledge (TK),Technological Content Knowledge (TCK),as well as the Technological Pedagogical Knowledge (TPK) levelsof Religious and Moral Education (RME) teachers in Ghana. The researchers employed descriptive survey as the research design. Questionnaire was the research instrument used to collect data from the teachers. The census sampling technique was also employed to include all 136 RME teachers inall 68 Public Junior High Schools in the Komenda-Edina-Eguafo-Abirem (KEEA) Municipality for the study.It was revealed from the study that the technological knowledge (TK) level of RME teachers was quite high. Again, the study uncovered that technological content (TCK) knowledge level of RME teachers was low. Lastly, technological pedagogical knowledge (TPK) level of RME teachers was also discovered to be low. Based on the findings of the study, conclusions and recommendations are discussed in this work.*

Key Words: *Technological Knowledge, Technological Content Knoweledge, Technological PedagogicalKnowledge*

Introduction

Teachers' knowledge in technology has been given rapt attention by educational researchers over the past decade. More especially, how teachers could blend their content and teaching methods with technology in this computer age. In this current age of modernity, the need for teachers to use technology during their instructional periods appears to be a key component in almost all perfection plans for education and educational transformation programmes (National Council for Accreditation of Teacher Education, 1997; Davis &Falba, 2002; International Society for Technology in Education, 2002; Dawson, Pringle & Adams, 2003; Thompson, Schmidt, & Davis, 2003).

As technology continues to expand across educational systems and cultures, teachers need to understand the connections among material and pedagogy more than the teachers need to understand. The evolution of technology information and how it blends with content, teaching and learning within those contexts poses new challenges for teachings technology (Mishra & Koehler, 2006; 2008; Rosenberg & Koehler, 2015). The TPACK paradigm expands the concepts of Shulman's pedagogical knowledge of substance (1986) to include technical teaching (Koehler, Mishra, Kereluik, Shin, & Graham, 2014; Mishra & Koehler, 2006).

For that call, Mishra and Koehler (2006), recently introduced the union of three different types of knowledge as representative of what teachers need to know, "technological pedagogical content knowledge" as a build-up of Shulman's initial pedagogical content knowledge. It is expounded by Mishra and Koehler (2006), that quality teaching requires developing a nuanced understanding of the complex relationships between technology, content, and pedagogy, and using this understanding to develop appropriate, context-specific strategies and representations.

Context and Purpose of the Study

Most of the studies conducted on the concept of Technological Pedagogical Content Knowledge (TPACK) (Engida, 2014; Kavanoz, Yüksel, and Özcan,2015; Kihoza, Zlotnikova, Bada and Kalegele, 2016; Asare-Danso, 2017) have established that teachersin general have content and pedagogical knowledge and pedagogical content knoweledge. However, the other parts of the seven constructs seem not to have been given the needed attention. This work therefore seeks to dive deep into three constructs of the TPACK model.

Research Questions

The following research questionsdirected the study.

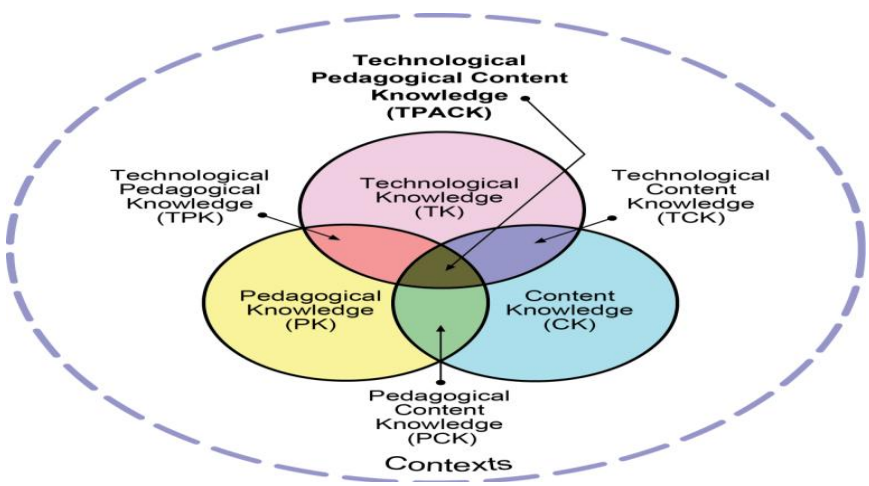
1. What is the level of RME teachers' Technological Knowledge (TK)?
2. What is the level of RME teachers' Technological Content Knowledge (TCK)?
3. What is the level of RME teachers'Technological Pedagogical Knowledge (TPK)?

Literature Review

Technological Pedagogical Content Knowledge (TPACK) System

The technological pedagogical content knowledge (TPACK) model dominates the study and understanding approaches to teacher knowledge and technology adoption, but literature also notices different shortcomings (Koehler et al., 2014). The idea that individual elements are difficult to understand and alter information over time is one of these drawbacks (Brantley-Dias &Ertmer, 2013; Cox & Graham, 2009). In accordance with this, the TPACK system was blamed for not capturing the living nuances of teachers and being of no benefit for professionals (Brantley-Dias &Ertmer, 2013; Graham, 2011; Voogt et al., 2013). Whereas TPACK originally put itself in perspective (Mishra & Koehler, 2008), the connections between specific contexts, the creation of teacher awareness, teacher technology attitudes and classroom teaching are minimal (Angeli&Valanides, 2009; Doering, Veletsianos, Scharber, & Miller, 2009; Koehler et al., 2014). As TPACK researchers continue to provide conceptual aspects conceptualizations of TPACK more systematically and its meaning and connections between the TPACK and contexts are still being established (Koehler et al., 2014; Rosenberg & Koehler, 2015).

Technological pedagogical content knowledge (TPACK) is an understanding that emerges from interactions among content, pedagogy, and technology knowledge. Therefore, the need for teachers to use technology during their instructional periods appears to be a key component in almost all perfection plans for education and educational transformation programmes (National Council for Accreditation of Teacher Education, 1997; Davis &Falba, 2002; International Society for Technology in Education, 2002; Dawson, Pringle & Adams, 2003; Thompson, Schmidt, & Davis, 2003).



TPACK Framework: Koehler and Mishra (2006)

The model of technological pedagogical content knowledge (TPACK) argues that developing good content requires a thoughtful interweaving of all three key sources of knowledge: technology, pedagogy, and content. The core of the argument is that there is no single technological solution that applies for every teacher, every course, or every view of teaching (Mishra & Koehler, 2006). Therefore, developing insight into the technological pedagogical content knowledge of moral educators is paramount in the quest for teachers' knowledge level in teachers' technological knowledge and implementation.

The conceptual underpinning of the study is the Technological Pedagogical Content Knowledge (TPACK) framework conceptualized by Koehler and Mishra (2006) which is an augmentation of Pedagogical Content Knowledge (PCK), a knowledge domain for teaching put forward by Shulman (1986). To fully grasp the concept of TPACK framework and its elements, it is firstly worthwhile considering the historical advancement of the framework. This study gives much attention to the technological knowledge, technological content knowledge as well as technological pedagogical knowledge of Religious and Moral Education teachers.

Technological Knowledge (TK)

According to Koehler and Mishra (2009), defining technological knowledge is one challenging task to perform since technology continuously vacillates. A grasp of the meaning of technology will assist to mould the discernment of technological knowledge. Herschbach (1995) states that the term "technology" originates from the Greek word *technologia*, which means the systematic treatment of an art (or craft). He further claimed that the initial word "techne" merges the meanings of an art and a technique, embracing both a knowledge of the important principles and an ability to accomplish the desired outcomes" (p. 33). In this context, 'technique' denotes the competences of knowing and doing. Meanwhile the root meaning of the word goes beyond doing and knowing to incorporate other meanings, including, "argument, explanation, and principle, but its most relevant use is probably 'to reason' (Herschbach, 1995). Thus, technology means reasoned application.

In the setting of this study, technological knowledge is defined as knowledge about standard technologies, such as books, chalk/marker and blackboard/whiteboard, and more advanced technologies, such as the internet and digital video (Koehler, Mishra, Hershey &Peruski, 2004; Koehler & Mishra, 2005; Koehler, Mishra & Yahya, 2007). Technological knowledge comprises the knowledge that is needed to carry out particular technologies. In the instance of digital technologies as observed in the 21st century, technological knowledge encompasses knowledge of operating systems and computer hardware and the ability to use standard sets of software tools such as word processors, spreadsheets, browsers, and e-mail. Mishra and Koehler advanced that technological knowledge includes knowledge of how to install and remove peripheral devices, install, and remove software programmes, and create and archive documents. Nevertheless, it is worth mentioning that the revolutionised nature of technology over time, is parallel to technological knowledge and hence, making technological knowledge not fixed. From this standpoint, Mishra, and Koehler (2005) claim that operating systems, word processors, browsers and others will surely change, may utterly flush down, in the subsequent years with the changing scenes of technology. This therefore presumes that Religious and Moral Education teachers should possess superior arrays of technological knowledge that will aid their adjustment to new technologies that will come into view with time. In response to this, it is imperative for teacher educators to prepare the knowledge base teachers in order to help them to possess knowledge on modern technologies and new ones that will emerge with time so that teaching and learning in the 21st century will be fruitful in Ghana.

In their stipulation, Mishraand Koehler (2005)state that technology knowledge is the knowledge that talks of the diverse technologies stretching from low technologies to digital technologies such as the internet, digital video, interactive whiteboards, and software programmes. In this fashion, the knowledge teachers use to interact with students through a range of technologies. Standard technologies, including books, dry erase boards, chalkboards, and traditional overhead projectors, which require little training to implement in the classroom. Highly developed technologies like computers, internet and interactive whiteboards require specialised advanced-level skills that are not always innate to the teacher without training. Before teachers can use computers, they must understand how to interact with them (Koehler & Mishra, 2005).

Education Technology Research Development (2007) emphasizes teachers' need of competence in three major skills to effectively incorporate technology: technology skills, technology-supported pedagogy skills, and technology-related classroom management skills. Studying the perspectives of teachers on technology integration, Zhao (2007) testified that participants in his study stated they use a range of technology tools such as the overhead projector, television, videocassette recorder, and computers. Gulbahar and Guven (2008) conveyed that teachers accept as true the use of technology will be of more advantage to them, but they were short of the fundamental knowledge and competences of computer usage in teaching.

Technological Content Knowledge (TCK)

Technological Content Knowledge (TCK) signifies knowledge of subject matter representation with technology. Technological content knowledge (TCK) is an insight that technology and content impact and hampers each other (Mishra & Koehler, 2009). This is the capacity to control how the content a teacher wants to teach is affected by affordances of technology and vice versa. The availability of specific technology can help make the delivery of certain content easy to learn, concrete and real to students. It is the knowledge of how to utilise an emerging technology to represent specific concepts in a given content domain (Cox & Graham, 2009). It can be established from this definition that there is a bidirectional relationship between technology and content. At one hand, content constrains the representations given with technology and on the other hand technology can constrains the kinds of representations possible. This view is in agreement with the views of Mishra and Koehler (2006) who postulated that technological content knowledge is about the manner in which technology and content are equally related. This means that technology coerces the

representation of the subject matter taught. On the other hand, technology provides the types of content to be taught. For that reason, teachers' content knowledge alone is not enough to keep them efficient in this technological or digital age. It is evident that, technology has come to impact every facet of human endeavour. Mishra and Koehler, therefore indicated that, teachers need to know not just the subject matter they teach but also the manner in which the subject matter can be taught by the application of technology.
Technologies are emerging constantly, many hold great potential for education (Clark, 2013). It is important for teachers to find ways to lavish these technologies in education in order to maximize instructional gain. The inauguration of certain technological application has the tendency to influence the subject matter of such subject domains. It is therefore expected of teachers to possess knowledge on technologies and how they shape their content knowledge. From the standpoint of Harris et al., (2009), "teachers must understand which technologies are best suited for addressing which types of subject-matter, and how content dictates or shapes specific educational technological uses, and vice versa" (p. 400). Kereluik, Mishra and Koehler (2011) admonish technological content knowledge must be "flexible, creative, and adaptive" to enable teachers manage, direct and make use of technology in relatively special fashions.

Technological Pedagogical Knowledge (TPK)

Technological Pedagogical Knowledge is knowledge of the existence, components, and capabilities of various technologies as they are used in teaching and learning settings, and conversely, knowing how teaching might change as a result of using particular technologies (Mishra & Koehler, 2006). According to Owusu (2014), technological pedagogical knowledge is knowledge of using technology to implement different teaching methods. Again, Schmidt, Baran, Thompson, Mishra, Koehler and Shin (2009), define technological pedagogical knowledge as "knowledge of how various technologies can be used in teaching and to understanding that using technology may change the way teachers teach" (p. 125). Graham, Cox and Velasquez (2009) asserted that technological pedagogical knowledge is the knowledge of general pedagogical activities that a teacher can engage in using emerging technologies. For Acquah (2018), technological pedagogical knowledge is an understanding that a scope of apparatuses exists for a particular teaching task, the abilities to choose a teaching tool based on its fitness, strategies for using the teaching tools affordances, and knowledge of pedagogical strategies and the ability to apply those strategies for use of technologies.

From the above definitions, it can be understood that technological pedagogical knowledge concerns the way teachers are able to make their subject matter knowledge comprehensible and accessible to students through the use of technologies. If teachers are able to create or make whether simple or complex teaching methods or strategies that are usable and accessible by either learners or teachers themselves for the effective attainment of teaching and learning objectives regarding by the use of technology, then technological pedagogical is said to be well grounded in them. This offers a clear-cut proposal that the link between technology and pedagogy is also bidirectional as exist the relationship between technology and content.

In the classroom environment, it is expected of teachers to attain knowledge of generic technology-based ideas such as discussion boards, chat rooms, web games, and others to maintain class records, attendance, grading and plan instructional lessons. According to Acquah (2018), Knowledge of the teaching equipment will aid teachers realise how technology influences the systems and strategies of teaching and how effective teaching and learning can be achieved when teaching and learning is dependent on technology. Such knowledge would also enable the teacher to realise the constraint and affordances that technology can bring to bear on pedagogical strategies, approaches and designs (Abbitt, 2011). This proposes that teachers' technological pedagogical knowledge enlightens the teachers on the effect that a particular technological tool has or brings on their approaches to teaching and the overall impact on their instructional gains. That is to say that, technological pedagogical knowledge is the grasp and the conceptualisation of how classroom instruction can be affected or changed when particular technologies are used in a particular manner (Koehler & Mishra, 2009). In consonance, Savas (2011) therefore postulates that teachers with TPK know the pedagogical uses of any technology.

Similarly, teachers with TPK know how to augment their teaching and solve the pedagogical challenges by the use of technology. Savas (2011) opines that technology can improve or restrict pedagogy if a teacher can use the forums to invent an online dialogue environment. Savas emphasised this can assist teachers in the manner that teacher can raise the spirits of all the students to participate since students who hesitate to participate in oral discourse can easily participate in online discourse. The wait time can be increased to encourage student participation. These help teachers to make all the students active in learning process. In this case, technology affords the pedagogy. However, in order to be effective, the teacher should

know the structure of online discourse environment. For instance, online discourse may not give chance to give instant feedback. Moreover, both teachers and students should know the rules of using written discourse since it hides the gestures or mimics used for appreciation, approval or disapproval. In this case, pedagogy restricts the use of technology. The teacher should be able to identify the pedagogical issues that are difficult to solve in the absence of technology. Koehler and Mishra (2009) emphasize the importance of technological pedagogical knowledge by saying that most of the software programs or technological devices that teachers use is not designed for educational purposes. Consequently, deciding the pedagogical uses of the technologies which are originally used for the purpose of business, entertainment, communication, or social networking requires TPK. Other uses of TPK as suggested by Cox and Graham (2009) in their elaborated model are increasing student motivation and creating cooperative learning environment. In the context of this study, technological pedagogical knowledge is being assessed from the point of view of teachers understanding of technology and how knowledgeable they are in blending technology and pedagogy for the purpose of classroom instruction.

It can be established that technological pedagogical knowledge (TPK) deals with the ability to recognise how technology affects the methods and strategies of teaching and how effective teaching and learning can be achieved with technology. It includes the realisation of the constraints and affordances that technology can bring to bear on pedagogical strategies, approaches, and designs (Abbitt, 2011). A teacher with TPK should be able to realise that the technology they want to use does affect their teaching approaches, methods, and design. Basically, it is the realisation and conceptualisation of how teaching and learning can be affected or changed when particular technologies are used in a particular manner (Koehler & Mishra, 2009).

Methodology

Research Design

According to Amedahe and Gyimah (2016), research design can be conceived of as the sum scheme for soliciting responses to the research questions or for testing hypothesis. The design employed for the study was the descriptive cross-sectional survey. This design enables the exploration of the current state of a phenomenon and its vivid description (Gall, Gall, & Borg, 2007; Leavy, 2017). Creswell (2014) opines that the cross-sectional survey allows for the collection of data on a wide range or across board at the same time within a short period of time. This design enabled the researchers to collect data from teachers in all sixty-eight (68) junior high schools in the Komenda-Edina-Eguafo-Abirem (KEEA) to determine their level of technological pedagogical content knowledge.

Population, Sampling Technique and Sample Size

The focus of the study was onpublic Junior High School Teachers teaching Religious and Moral Education in the Komenda-Edina-Eguafo-Abirem Municipality in the Central Region of Ghana. There are sixty-eight Public Junior High Schools in the Municipality. The population of the study comprised of all RME teachers in all sixty-eight Junior High School (PJHS) in the KEEA Municipality. The selection of government assistedpublic junior high schools was considered right for the study because it is assumed generally that it is the government schoolteachers who have undergone proper or formal training in the field of teaching in their respective teaching subjects. Again, it is these teachers in the public schools that serve as part-time teachers in the private schools and some of those who are full time teachers in the private schools are mostly retired government schoolteachers (Bosu, 2010). Hence, they were the best to respond to the items excellently. There were two RME teachers in each of the sixty-eight schools, making 136. That was therefore used as the sample size for the study. The use of the census sampling technique enabled the researchers to provide ameasure of the population as well as enabling all teachers teaching the RME subject in the Municipality to be studied (Cara, 2019).

Instrument

The instrument employed for the study was questionnaire. The questionnaire was made up of close-ended items. In all, there were 29 closed-ended items which were structured into three sections: A, B, and C. Sections A, B, and C dealt with the Technological Knowledge (TK), Technological Content Knowledge (TCK) as well as Technological Pedagogical Knowledge (TPK) respectively. The instrument was given to colleague researchers to ascertain how they meet face and content validity. A pilot test was also carried out in the 10 schools with 25 teachers in the Cape Coast Metropolis in the Central Region of Ghana. To determine the reliability, a coefficient of Cronbach's alpha of 0.80 was obtained for the instrument. According to George and Mallery (2003), a Cronbach's co-efficient alpha level of 0.8 is rated to be goodwhilst 0.9 is rated as excellent. Therefore, an alpha level of 0.80 can be said to be excellently reliable instrument.

Analysis

Questionnaires were analysed with Statistical Package for Social Sciences (SPSS 23.0). Descriptive statistics such as means, and standard deviations were used to determine the direction of the responses.Results were presented in tables.

Results and Discussion

Research Question One: What is the level of RME teachers' Technological Knowledge (TK)?

This research question sought to find out the technological knowledge level of RME teachers. Teachers were asked to indicate the level of their agreement or disagreement of the items on their TK. Their responses are presented in Table 1.

Table 1- Technological Knowledge (TK) Level of RME Teachers

Statement	Mean	SD
I am capable of learning technology easily	4.88	3.42
I keep abreast with new technologies	4.68	.59
I have the skills I need in using technology	3.22	1.35
I can use PowerPoint or similar programmes to create a basic presentation	3.15	1.29
I can install a new programme that I would like to use in teaching RME	2.89	2.06
I have the knowledge to save an image from a website to the hard drive of my computer and or vice versa	2.80	1.39
I am vexed with the creation and editing of images and video clips using the required applications	2.70	1.02
I know how to solve my own technical problems with regards to the use of ICT	2.65	1.02
I can create electronic and website accounts	2.01	.12
Mean of means/Standard Deviation	3.23	1.35

Source: Field Survey, 2021.

Results from Table 1 gives much evidence to suggest that generally, most RME teachers have high level of technological knowledge since the calculated Mean of means was greater than the test value of 3.0 (MM=3.23, SD=1.35)**.** However, dwelling on the individual items, the results give indications that there were variations in terms of magnitude in the mean scores and standard deviations. Some of these prominent reasons include the fact that RME teachers strongly agreed that they were capable of learning technology easily (M=4.88, SD=3.42). This finding is essential because technology like culture is not static but rather, it keeps on changing and so teachers should always be ready to learn the new emerging technology for the effective and dynamic teaching in the modern age. Lending this to the TPACK theory, Mishra, and Koehler (2008), argue that technological knowledge involves the knowledge that is required to operate particular technologies. They added that technological knowledge is not fixed and therefore teachers should have the ability to learn new technologies as they keep emerging and changing to effectively make use of them for teaching and learning process in this era of technological advancement. This is because as the nature of technology keeps changing with time, so shall technological knowledge change. Hence, teachers pointing out their ability to learn new technology is of much essence to the age of technology. Again, the teachers pointed out that they keep themselves abreast with new technologies (M=4.68, SD=.59). This suggests that RME teachers are very knowledgeable in terms of different types of technology.

Furthermore, the teachers pointed to the fact that they know many different technologies that they can use in teaching RME (M=3.31, SD=1.19). In other words, RME teachers demonstrated their consciousness and their efforts to familiarize themselves with technology and hence, can use it in one way or the other. Again, concerning the skills necessary for using technology, RME teachers agreed that they possess the skills they need in using technology (M=3.22, SD=1.35). The teachers further agreed that they have high knowledge about the usage of PowerPoint or similar programmes to create a basic presentation (M=3.15, SD=1.29). This revelation aligns with the point made by Zhang and Martinovic (2008) that most tertiary educational institutions are also going digital where they use the e-learning platform to make teaching and learning accessible to all learners despite the busy schedules of lecturers/tutors. They also added that such a platform is good in enhancing teachers' technological knowledge and making them appreciate the use of digital tools.

In a sharp contrast, the teachers exposed that they have low level of knowledge in creation and editing of images and video clips using the required applications (M=2.70, SD= 1.02). In the same vein, on their ability to create electronic and website account, RME teachers showed that they have low knowledge

on this matter (M= 2.01, SD=.12). It can be argued to some extent that RME teachers lack adequate knowledge about the procedures to be followed in installing new computer programmes they want to use, create and edit videos as well as creating their own websites or electronic accounts. This may be because, though teachers interact with technology, their knowledge is not rooted in their deep knowledge as things they have formally learnt but through surface interaction knowledge. Lending this to the TPACK theory, Koehler, Mishra, and Yahya (2007) advanced that technological knowledge comprises knowledge of how to install and remove peripheral devices, install and remove software programmes, and create and archive documents. In the same vein, Ekrem and Recep (2014) stressed that it appears that, even though RME teachers seem plausible or attached to technology, their awareness on technology is not at the desired level of acceptance. This further gives room for the presupposition that RME teachers are, as well, going to be faced with the challenge of using more sophisticated technology resources such as video processing, web page development, creating reusable learning objects, database, multimedia, and composition, as reported in a study by Raman and Yamat (2014).

Even though respondents demonstrated a low level of knowledge on some items, the overall mean (Mean of means) and standard deviation values for the Technological Knowledge (TK) of Religious and Moral Education teachers in the Komenda-Edina-Eguafo-Abirem Municipality (MM=3.23, SD=1.35) justifies that they have high knowledge in technology.

Research Question Two: What is the level of RME teachers' Technological Content Knowledge (TCK)?

This research question sought to find out the technological knowledge level of RME teachers. Teachers were asked to indicate the level of their agreement or disagreement of the items on their TK. Their responses are presented in Table 2

Table 2- Technological Content Knowledge (TCK) of RME Teachers

Statement	Mean	SD
I can use various types of technologies to deliver the content of my subject matter	2.47	.52
I know about technologies that I can use for teaching specific concepts in my subject area	2.38	.60
I know about technologies that I can use for enhancing the understanding of specific concepts in my subject matter	2.35	.69
I can use technological representations (i.e. multimedia, visual demonstrations, etc.) to demonstrate specific concepts in my subject matter	2.31	.48
I can use technology to conduct research in my subject area	2.30	.49
I can create a software to aid my teaching	2.29	.50
I can use specialized software to perform inquiry about my teaching subject	2.28	.54
I can use technology to make students observe phenomenon that would otherwise be difficult to observe in my subject area	2.24	.46
I know how my subject matter can be represented by the application of technology	2.24	.46
Mean of means	2.32	.53

Source: Field Survey, (2021)

The results from Table 2 lend considerable proof to intimate that generally, most RME teachers have low level of Technological Content Knowledge (TCK) since the calculated Mean of means was greater than the test value of 3.0 (MM=2.32, SD=.53). The lower standard deviation value confirms their homogeneous response to the research question that they were confident of their response. Among such evidence from the table is the fact that RME teachers indicated that they have low knowledge on the use of various types of technologies to deliver the content of the subject matter (M=2.47, SD=.52). This implies that RME teachers were ignorant of the available technologies that can aid the teaching of RME subject. Also, the teachers portrayed knowledge of technologies that they can use for teaching specific concepts in their subject area (M=2.38, SD=.60) however it was found to be low, as well as low knowledge of technologies that they can use for enhancing the understanding of specific concepts in their subject matter (M=2.35, SD=.69). These finding give reason to the fact that RME teachers were ignorant of how to utilise emerging technologies to teach concepts in their subject area. Cox and Graham (2009) acknowledged that Technological Content Knowledge is the knowledge of how to utilise an emerging technology to represent specific concepts in a given content domain.

Furthermore, on the use of technological representations (i.e., multimedia, visual demonstrations, etc.) to demonstrate specific concepts in my subject matter, RME teachers indicated a low level of knowledge (M=2.31, SD=.48). Owusu (2014) indicated that teachers know how their subject matter can be represented

by the application of technology. Owusu (2014) further noted that teachers in New Zealand can use technological representations (i.e. multimedia, visual demonstrations, and many more) to demonstrate specific concepts in their subject matter. This finding does not agree with the findings of Owusu (2014) that teachers know how their subject matter can be represented by the application of technology. Owusu further indicated that teachers in New Zealand can use technological representations (i.e. multimedia, visual demonstrations, and many more) to demonstrate specific concepts in their subject matter. However, it must be stated that Owusu's finding might have been influenced by the context in which the study was conducted. This is because, the reality is that, all other things being equal, New Zealand would have their teachers exposed to technology than teachers in Ghana.

Again, the teachers showed that they possess a low knowledge in the usage of technology to conduct research in their subject area (M= 2.30, SD= .49). Again, these findings resonate with the work of Acquah (2018) who found out that RME teachers in Ghana lack high level of knowledge of technologies that can aid their teaching of specific concepts in the subject. Furthermore, the RME teachers indicated that they have low knowledge in the usage of specialized software to perform inquiry about their teaching of the subject (M=2.28, SD=.54). Moreover, the teachers fingered out that their knowledge in the use of technology to make students observe phenomenon that would otherwise be difficult to observe in their subject area was low (M=2.24, SD=.46). Finally, the teachers pointed to the fact that they have low knowledge in how their subject matter can be represented by the application of technology (M=2.24, SD=.46).

The findings of the results do not find consonance with the stipulations of Harris and Hofer (2009) who stress that "teachers must understand which technologies are best suited for addressing which types of subject-matter, and how content dictates or shapes specific educational technological uses, and vice versa" (p. 400). Furthermore, the findings of this study is in consonance with Mai and Ken-Neo (2003) who contend that multimedia technologies significantly influence students' learning by broadening their scope of learning and knowledge. This implies that educators can transform the subject matter using technological resources such as multimedia/hypermedia to support students to display their ideas and information to improve student's higher order thinking skills like analysis, synthesis, and evaluation to become active learners rather than memorizing knowledge.

Research Question Three: What is the level of RME teachers' Technological Pedagogical Knowledge (TPK)?

This research question sought to find out the technological knowledge level of RME teachers. Teachers were asked to indicate the level of their agreement or disagreement of the items on their TK. Their responses are presented in Table 3.

Table 3- Technological Pedagogical Knowledge (TPK) Level of RME Teachers

Statement	M	SD
I can use technology to assess my students learning	2.40	.80
I can apply different technologies to different teaching activities	2.38	.53
I can use technologies that enhance students' learning for a lesson	2.38	.53
I can effectively manage a technology-rich classroom	2.36	.66
I am able to use technology to introduce my students to real world situations	2.35	.50
I can use technologies that are appropriate for my teaching	2.24	.43
I can use technologies that enhance effective teaching	2.24	.48
My educational background has helped me to know how technology couldinfluence the teaching strategies I use in my classroom	2.04	.19
Mean of means	2.34	.57

Source: Field Survey,2021

The results from Table 3 offers substantial attestation to infer that generally, most RME teachers inGhana, have low level of Technological Pedagogical Knowledge (TPK) since the calculated Mean of means was lesser than the test value of 3.0 (MM=2.34, SD=.57). Again, it can be confirmed from the standard deviation that the teachers were all together with their response since the standard deviation value is low. Among such substantiations from the table is the fact that RME teachers indicated that they have low knowledge on the use of technology to assess my students learning (M=2.40, SD=.80). In addition, the RME teachers pointed out that they have low knowledge on the application of different technologies to different teaching activities (M=2.38, SD=.53). Again, the RME teachers indicated that they have low knowledge on the use of technologies that enhances students learning.

In relation to their responses on the effective management of technology-rich classroom the teachers showed a low level of knowledge (M=2.36, SD=.66). This is not surprising because managing

technology is not done with the layman's perspective, not to talk of its effectiveness. Effective management of technology is done through high level of technological knowledge. According to Graham, Cox and Velasquez (2009), technological pedagogical knowledge is the knowledge of general pedagogical activities that a teacher can manage and engage in using emerging technologies. Coupled with this, RME teachers showed that they are able to use technology to introduce their students to real world situations (M=2.35, SD=.50).

Furthermore, RME teachers pointed to the fact that they have low knowledge regarding the use of technologies that are appropriate for their teaching (M=2.24, SD=.43) as well as the use of technologies that enhance effective teaching (M=2.24, SD=.48). Finally, RME teachers indicated that their educational backgrounds have prepared helped them to know how technology could influence the teaching strategies they use in their classroom (M=2.04, SD=.19). Lending the results to the TPACK theory, Schmidt, Baran, Thompson, Mishra, Koehler and Shin (2009), describe technological pedagogical knowledge as "knowledge of how various technologies can be used in teaching and to understanding that using technology may change the way teachers teach" (p. 125).

The findings of this study confirm Duffield (1997) position that technology is not a subject and that the focus of integration is on effective practices for teaching and learning. Teachers need to be able to make choices about technology integration without becoming technocentric by placing undue emphasis on the technology for its own sake without connections to learning and the curriculum.

Conclusions and Recommendations

Even though RME teachers were found to be highly knowledgeable in technology especially on their ability of learning new technologies easily, keeping abreast with new technologies, knowing technologies that can be used in teaching and their knowledge on the usage of PowerPoints to create a basic presentations as solicited from their responses; They were found to lack high knowledge in installing new programmes that they would like to use in teaching, saving, creating and editing of images and video clips creating and editing websites. This finding draw attention to the two-sidedness of teachers' technological knowledge. The first being that though teachers know but may not be able to practice in that they might have been finger pointed knowledge but not actually a practicable knowledge. Again, it can also imply that though teachers really know it but lack of provision of such technologically enabled environments and equipment prevents their practice. Also, teachers' inability to create, editing videos and others can hinder their practice in teaching of the RME subject because, for the lesson in RME to be, real and practical teachers require to create video scenarios and practical lessons for the students to watch. This therefore will require extra help. It can only be assumed that teachers will be able to use technology in their teaching endeavours. The Ministry of Education through the Ghana Education should therefore take it as a matter of urgency to organize training programmes to teachers on the use of common technologies, applications, and tools that will help teachers to get a grip of the needed materials surfing the internet.

Quite apart from the fact that teachers portrayed a high sense of technological knowledge, most of the RME teachers were ignorant about technologies that they could use for teaching specific concepts in their subject area, how their subject matter could be represented by the application of technology and technologies that they could use to promote understanding of specific concepts in their subject matter. They also showed that they lacked the capacity to blend technology with their content. In effect, their technological content knowledge level was low. The Ministry of Education should provide teacher educators with the state-of-the-art technological resources such as computers, projectors, interactive boards and internet connectivity to motivate them to make Religious and Moral Education classroom technologically oriented in nature. This will help ensure that the RME teachers are adequately prepared to blend technology with their content.

Obviously, teachers' inability to select the right content with the right technology can have effect on their ability to use technology to select the right methods for teaching. As such, their response gave the impression that most of the RME teachers were ignorant about technologies that they could use for teaching specific concepts in their subject area, how their subject matter could be represented by the application of technology and technologies that they could use for enhancing the understanding of specific concepts in their subject matter. Again, they were incapable of using various types of technologies to deliver the content of their subject matter, using technological representations to demonstrate specific concepts in their subject matter; using technology to make students observe phenomenon that would otherwise be difficult to observe in their subject area and using technology to conduct research in the subject area.There is the need for a collaboration between curriculum designers and application software experts to design the teacher

education programme in a way that will be able to infuse modern technology into the teaching strategies employed for the teaching and learning of Religious and Moral Education.

References

1. Abroampa, W. K. (2007). Assessing the challenges in the implementation of thereligious and moral education programme: The case of selected teacher training colleges in Ghana.Unpublished master's thesis, University of Cape Coast, Cape Coast.
2. Amedahe, F. K., & Gyimah, E. A. (2016). Introducation to educational research. Centre for Continuing Education, University of Cape Coast, Ghana.
3. Acquah, A. (2018). Religious and Moral Education Student-Teachers Technological Pedagogical Content Knowledge preparedness in colleges of education in Ghana: A survey. Unpublished master's thesis, University of Cape Coast, Cape Coast.
4. Agyei, D. D., & Voogt, J. M. (2012). Exploring the potential of the will, skill, and tool model in Ghana: Predicting prospective and practicing teachers' use of technology. Computers and Education, 56(1), 91-100.
5. Asare-Danso, S. (2017). Assessing technological, pedagogical and content knowledge of Religious and Moral Educators of colleges of education in Ghana: A Survey. International Journal of Education and Social Science, 4(11), 29-39.
6. Bosu, L. (2010). Assessing the pedagogical content knowledge of accounting teachers in senior high schools in the central region of Ghana.Unpublished master's thesis, University of Cape Coast, Cape Coast.
7. Clark, C. (2016). A phenomenological study of the impact of pre-service and inservice training regarding the integration of twenty-first centurytechnologies into selected teachers' instruction. Unpublished doctoral dissertation, Liberty University.
8. Creswell, J. W. (2014). A concise introducation to mix methods of research. London: Sage Publications.
9. Davis, K. S., & Falba, C. J. (2002). Integrating technology in elementary preserviceteacher education: orchestrating scientific inquiry in meaningful ways. Journal of Science Teacher Education, 13(4), 303–329.
10. Dawson, K., Pringle, R., & Lott Adams, T. (2003). Providing links betweentechnology integration, methods courses, and school-based fieldexperiences: A curriculum-based and technology-enhanced microteaching.Journal of Computing in Teacher Education,20(1), 41-47.
11. Dinama, B. (2013). Pedagogical knowledge of religious education teachers in Botswana junior secondary schools. Social Sciences and Humanities, 4(3), 443-446.
12. Dunmire, R. E. (2010). The use of instructional technology in the classroom:Selection and effectiveness. Unpublished masters' thesis, United States Military Academy, New York.
13. Ekrem, S., & Recep, C. (2014). Examining PreserviceEFL Teachers' TPACK Competencies in Turkey. Journal of Educators Online, 11(2), 1-22.
14. Engida, T. (2014). Chemistry teacher professional development using technological pedagogical content knowledge framework. AmericanJournal of Chemistry Education, 4(3), 2-21.
15. Forsell, K. S. (2011). Technological pedagogical content knowledge of Californiateachers.Unpublished doctoral thesis, University of California, California.
16. Gall, M. D., Gall, J. P., & Borg, W. R. (2007). Edudcational research:An introduction (8th ed.). New York: McGraw Hill.
17. George, D., & Mallery, M. (2003). Using SPSS for Windows step by step: a simple guide and reference. London: Pearson.
18. International Society for Technology in Education. (2002). National educationaltechnology standards for teachers: Preparing teachers to use technology. MA: ISTE, Danvers.
19. Cara, O. (2019). Uses of Sampling in the Census. Retrieved from www.fao.org/fileadmin
20. Kihoza, P., Zlotnikova, I., Bada, J., & Kalegele, K. (2016). Classroom ICT integration in Tanzania: Opportunities and challenges from the perspectives of TPACK and SAMR models.International Journal of Education and Development using Information and Communication Technology,12(1), 107-128.
21. Koehler, M. J., Mishra, P., & Yahya, K. (2007). Tracing the development of teacher knowledge in a design seminar: Integrating content, pedagogy and technology. Computers and Education, 49, 740-762.
22. Koehler, M. J., & Mishra, P. (2008). Handbook of technological pedagogical content knowledge (TPACK) for educators. New York: American Association of Colleges for Teacher Education.
23. Mishra, P., & Koehler, M. J. (2006). Technological pedagogical contentknowledge: A framework for teacher knowledge. Teachers College Record,108(6), 1017-1054.
24. Koehler, M., & Mishra, P. (2009). What is technological pedagogical content knowledge (TPACK)? Contemporary issues in technology and teacher education, 9(1), 60-70.
25. Kwakye, S. A. (2016). Technological pedagogical content knowledgepreparedness of studentteachers of the Department of Arts and Social Sciences Education (DASSE) ofuniversityof Cape Coast.Unpublished master's thesis, University of Cape Coast, Cape Coast.
26. Leavy, P. (2017). Research design: Quantitaive, qualitative, mixed methods, arts-based and community-based participatory research approaches.New Jersey: Guilford Publications.
27. Lickona, T. (1993). The return of character education.Educational leadership,51(3), 6-11.

28. National Council for the Accreditation of Teacher Education. (1997). Technologyand the new professional teacher: Preparing for the 21st century classroom.Washington, D.C.: Author.
29. Pelled, L. H. (1996). Demographic diversity, conflict, and work group outcomes: An intervening process theory.Organization Science,7(6), 615-631.
30. Pundt, H. Y., & Duit, R. (1994). Bibliography: Students' and Alternative Frameworks and Science Education.
31. Raman, K., & Yamat, H. (2014). Barriers teachers face in integrating ICT during English lessons: A case study.Malaysian Online Journal of Educational Technology,2(3), 11-19.
32. Shulman, L. S. (1986). Those who understand knowledge growth in teaching. Educational Research, 15(2),4-14.
33. Thompson, A. D., Schmidt, D. A., & Davis, N. E. (2003). Technology collaborative for simultaneous renewal in teacher education. Educational TechnologyResearch and Development, 51(1), 124–128.
34. Zhang, Z., & Martinovic, D. (2008). ICT in teacher education: Examining needs, expectations andattitudes.The Canadian Journal of Learning and Technology,34(2), 149-158.
35. Zhou, G., Zhang, Z., & Li, Y. (2011). Are secondary preservice teachers well prepared to teach with technology? A case study from China.AustralasianJournal of Educational Technology,27(6), 89-97.